# ATTACHMENT E: POST-INJECTION SITE CARE AND SITE CLOSURE PLAN

## Facility Information

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|---|---|
| Facility name: | Archer Daniels Midland, CCS#1 Well<br>IL-115-6A-0002 |
| Facility contact: | Mr. Mark Burau, Plant Manager,<br>4666 Faries Parkway, Decatur, IL,<br>(217) 424-5750, mark.burau@adm.com |
| Well location: | Decatur, Macon County, IL;<br>39° 52' 37.06469" N, 88 ° 53' 36.25685" W |

This Post-Injection Site Care (PISC) and Site Closure Plan describes the activities that ADM will perform to meet the requirements of 40 CFR 146.93. The CCS#1 well is related to CCS#2 well at the Illinois Industrial Carbon Capture and Sequestration (IL-ICCS) project (EPA permit No: IL-115-6A-0001). Delineation of the area of review (AoR) for CCS#1 incorporates injection activities at CCS#2 (i.e., the two wells will create a single $CO_2$ plume and pressure front). Therefore, post-injection monitoring and an ultimate non-endangerment demonstration for the two wells/projects are closely tied. Injection at this project was initiated under the Illinois Environmental Protection Agency's permit (Permit No.: UIC-012-ADM).

ADM will monitor ground water quality and track the position of the $CO_2$ plume and pressure front until site closure is authorized at CCS#2. This alternative PISC timeframe was approved by EPA, but ADM may not cease post-injection monitoring until a demonstration of non-endangerment of underground sources of drinking water (USDWs) for CCS#1 has been approved by the UIC Program Director pursuant to 40 CFR 146.93(b)(3) and the conditions of permit number IL-115-6A-0001. Following approval for site closure for CCS#1, ADM will plug all monitoring wells, restore the site to its original condition, and submit a site closure report and associated documentation.

## Pre- and Post-Injection Pressure Differential

The formation pressure at the injection well is predicted to decline rapidly within the first 4 years following cessation of injection at CCS#2. Based on the modeling of the pressure front as part of the AoR delineation, pressure is expected to decrease to pre-injection levels by the end of the PISC timeframe. Additional information on the projected post-injection pressure declines and differentials is presented in the AoR and Corrective Action Plan (Attachment B to this permit).

## Predicted Position of the $CO_2$ Plume and Associated Pressure Front at Site Closure

Figure 1 shows the predicted extent of the plume and pressure front at the end of the PISC timeframe. This map is based on the final AoR delineation modeling results submitted for CCS#2 in January 2014, per 40 CFR 146.84.

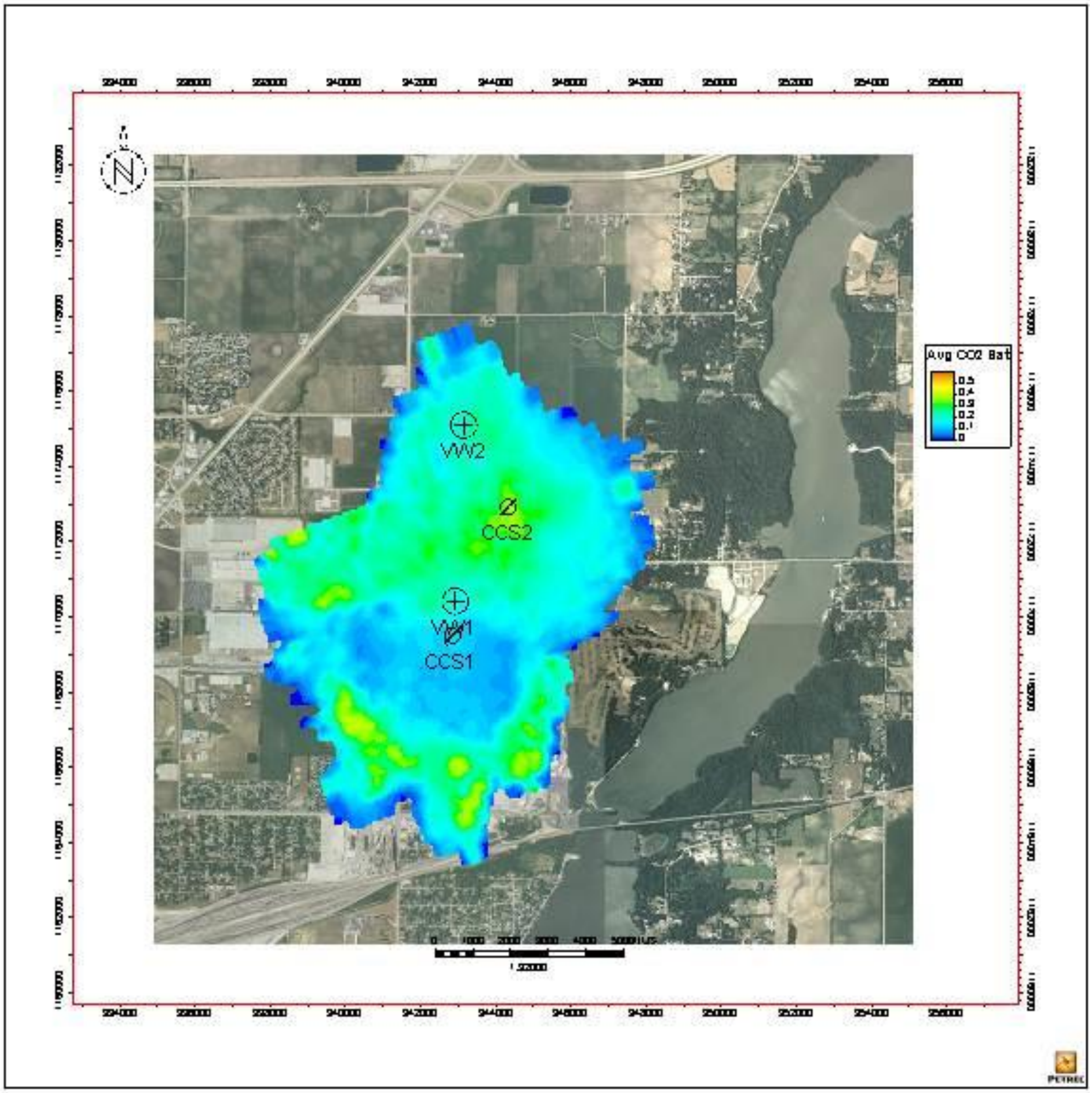


**Figure 1. Predicted extent of the $CO_2$ plume and pressure front at site closure (est. yr. 2030).**

## Post-Injection Monitoring Plan

Performing ground water quality monitoring and plume and pressure-front tracking as described in the following sections during the post-injection phase will meet the requirements of 40 CFR 146.93(b)(1). (Note that the frequencies at which post-injection monitoring activities will be performed will vary slightly as the phases of the CCS#1 and CCS#2 projects change—from the "interim period" between approval of the CCS#1 permit and commencement of injection operations at CCS#2, to the injection phase at CCS#2, to the post-injection phase following cessation of injection at CCS#2. These are presented in the tables below.)

The results of all post-injection phase testing and monitoring will be submitted annually, within 60 days of the anniversary date of the date on which injection ceases, as described under "Schedule for Submitting Post-Injection Monitoring Results," below.

A Quality Assurance and Surveillance Plan (QASP) for all testing and monitoring activities conducted during the three components of the post-injection phase is provided in the Appendix to this PISC and Site Closure Plan.

During the post-injection period, CCS#1 will be used as a monitoring well for CCS#2. CCS#1 will not require modification to monitor the temperature and pressure of the Mt Simon Sandstone. To prepare this well for monitoring activities, ADM will displace the injectate and reservoir fluids with inhibited brine. The brine will displace fluids in the tubing, below the packer, and proximate to the wellbore at the injection interval.

VW#1 is an integral piece of the monitoring strategy for both ADM CCS#1 and CCS#2. VW#1 has been previously constructed utilizing the Westbay tubing and packer system, which meets the Director's approval. VW#1 may be recompleted (see Figure 2) prior to its use for sampling as described in this plan, or the Westbay system may remain. If VW#1 is recompleted, the following general procedures will be used.

If ADM determines to use an alternative other than that proposed in Figure 2 and described in the procedures, ADM will notify EPA of the anticipated change prior to conducting the recompletion in compliance with Part N(5)(b) of this permit.

In accordance with Part F(7) of the permit, ADM will submit final "as completed" specs of VW#1 to the UIC Program Director within 30 days of recompletion or prior to the first sampling event, whichever comes first.

1. Kill well and remove Westbay tubing and packers.

2. Spot cement plug across the perforated section of the Ironton Galesville. (Note: to reduce the potential of reservoir fluid migration, the time between removing the Westbay system and spotting the cement plug across the Ironton Galesville should be about 1-2 days.)

3. Drill out cement plug and spot cement plugs across the perforated sections of the Mt. Simon Sandstone.

4. Drill out plugs and pressure test the casing.

5. Run casing scraper and circulate well with fresh brine.

6. Perforate the well at the predefined zones within the Mt Simon Sandstone.

7. Using plugs or packers, perform pump in or swab test of perforated zones.

8. Perforate the well at the predefined zones within the Ironton Galesville.

9. Using plugs or packers, perform pump in or swab test of perforated zones.

10. Remove plugs and/or packers.

11. Install recompletion equipment and test well integrity (see Table 5).

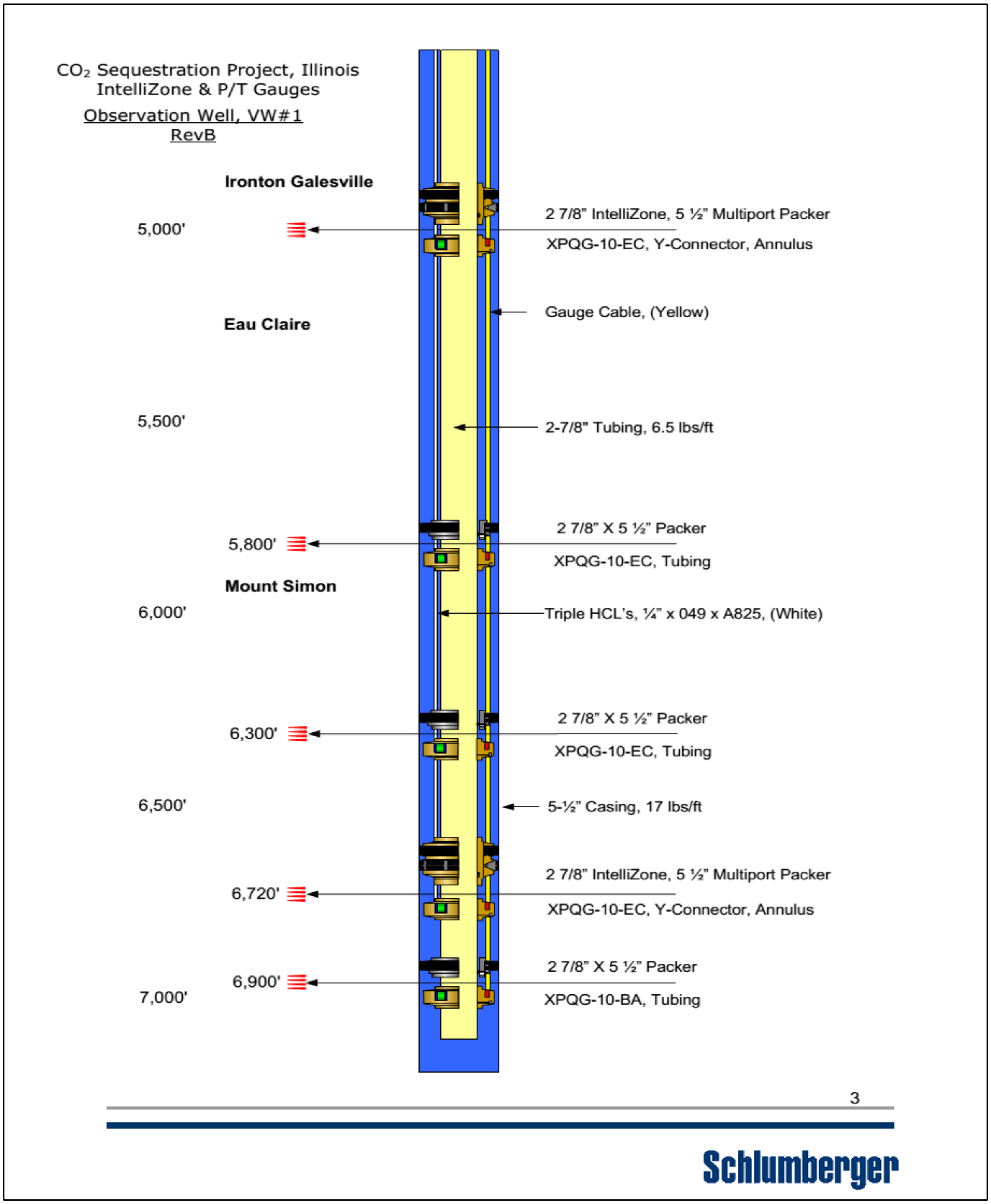


**Figure 2. Representation of VW#1 recompletion plan. Actual recompletion may differ.**

## Ground Water Quality Monitoring

Table 1 and Table 2 present the planned direct and indirect monitoring methods, locations, and frequencies for ground water quality monitoring above the confining zone in the Quaternary and/or Pennsylvanian strata, the St. Peter Sandstone, and the Ironton-Galesville Formation. All of the monitoring wells are located on ADM property, and therefore access to these wells is guaranteed. Table 3 identifies the parameters to be monitored and the analytical methods ADM will employ. Figure 3 and Figure 4 (on pages E10 and E11, respectively) show the locations of the IDBP monitoring wells.

Sampling will be performed as described in Section B.2 of the QASP; this section of the QASP describes the ground water sampling methods to be employed, including sampling SOPs (Section B.2.a/b), and sample preservation (section B.2.g). Sample handling and custody will be performed as described in Section B.3 of the QASP. Quality control will be ensured using the methods described in Section B.5 of the QASP.

**Table 1. Post-injection phase direct ground water monitoring above confining zone.[1,2]**

| Target Formation | Monitoring Activity | Monitoring Location(s) | Frequency: Interim Period | Frequency: CCS#2 Injection Phase | Frequency: CCS#2 Post-Injection Phase |
|---|---|---|---|---|---|
| Quaternary and/or Pennsylvanian strata | Fluid sampling | Shallow monitoring wells: MVA10LG, MVA11LG, MVA12LG, MVA13LG | Quarterly[3] | Year 1-2: Quarterly<br>Year 3-5: Semi-Annual | Annual |
| | | Shallow monitoring wells: G101, G102, G103, G104 | Quarterly | Year 1-3 (2015-2017): Semi-Annual | None |
| | Distributed temperature sensing (DTS) | CCS#1 | Continuous[4] | Continuous | Year 1: Continuous<br>Year 2-10: None |
| | | CCS#2 | None | Continuous | Year 1: Continuous<br>Year 2-10: None |
| St. Peter | Fluid sampling | GM#2 | Once[3] | Annual | Annual |
| | Pressure/ temperature monitoring | GM#2 | None | Continuous | Year 1-3: Continuous<br>Year 4-10: Annual |
| | DTS | CCS#1 | Continuous[4] | Continuous | Year 1: Continuous<br>Year 2-10: None |
| | | CCS#2 | None | Continuous | Year 1: Continuous<br>Year 2-10: None |

| Target Formation | Monitoring Activity | Monitoring Location(s) | Frequency: Interim Period | Frequency: CCS#2 Injection Phase | Frequency: CCS#2 Post-Injection Phase |
|---|---|---|---|---|---|
| Ironton-Galesville | Fluid sampling | VW#1 | Once(3) | Year 1-3: Annual<br>Year 4-5: None | None |
| | | VW#2 | Once(3) | Annual | Annual |
| | Pressure/ temperature monitoring | VW#1 | Continuous(4) | Year 1-3: Continuous<br>Year 4-5: None | None |
| | | VW#2 | None | Continuous | Year 1-3: Continuous<br>Year 4-10: Annual |
| | DTS | CCS#1 | Continuous(4) | Continuous | Year 1: Continuous<br>Year 2-10: None |
| | | CCS#2 | None | Continuous | Year 1: Continuous<br>Year 2-10: None |

Notes:

1. Collection and recording of continuous monitoring data will occur at the frequencies described in Table 4.
2. Annual sampling and monitoring will occur up to 45 days before the anniversary date of cessation of injection or alternatively scheduled with the prior approval of the UIC Program Director.
3. The interim period fluid sampling listed in the table will be conducted at each specified well prior to completion of the CCS#1 operational period or during the CCS#1 interim period. This sampling can be used to satisfy both this interim period sampling requirement and the baseline sampling requirement described in Attachment C to the CCS#2 permit (IL-115-6A-0001).
4. During well maintenance activities pressure and temperature monitoring may be suspended.

**Table 2. Post-injection phase indirect ground water monitoring above the confining zone.(1)**

| Target Formation | Monitoring Activity | Monitoring Location(s) | Frequency: Interim Period(2) | Frequency: CCS#2 Injection Phase | Frequency: CCS#2 Post-Injection Phase |
|---|---|---|---|---|---|
| Quaternary and/or Pennsylvanian strata | Pulse neutron logging/RST | VW#1 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| | | VW#2 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| | | CCS#1 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| | | CCS#2 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| St. Peter | Pulse neutron logging/RST | VW#1 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| | | VW#2 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| | | CCS#1 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |

| Target Formation | Monitoring Activity | Monitoring Location(s) | Frequency: Interim Period[2] | Frequency: CCS#2 Injection Phase | Frequency: CCS#2 Post-Injection Phase |
|---|---|---|---|---|---|
| | | CCS#2 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| Ironton-Galesville | Pulse neutron logging/RST | VW#1 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| | | VW#2 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| | | CCS#1 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| | | CCS#2 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |

Notes:
1. Logging surveys will occur within 45 days before the anniversary date of cessation of injection or alternatively scheduled with the prior approval of the UIC Program Director.
2. A single round of pulse neutron logging/RST logging will be conducted at each specified well prior to completion of the CCS#1 operational period or during the CCS#1 interim period. This logging can be used to satisfy both this interim period logging requirement and the baseline logging requirement described in Attachment C to the CCS#2 permit (IL-115-6A-0001).

**Table 3. Summary of analytical and field parameters for ground water samples.**

| Parameters | Analytical Methods[1,2] |
|---|---|
| **Quaternary/Pennsylvanian** | |
| **Cations:**<br>Al, Ba, Mn, As, Cd, Cr, Cu, Pb, Sb Se, and Tl | ICP-MS,<br>EPA Method 6020 |
| **Cations:**<br>Ca, Fe, K, Mg, Na, and Si | ICP-OES,<br>EPA Method 6010B |
| **Anions:**<br>Br, Cl, F, $NO_3$, and $SO_4$ | Ion Chromatography,<br>EPA Method 300.0 |
| **Dissolved $CO_2$** | Coulometric titration,<br>ASTM D513-11 |
| **Total Dissolved Solids** | Gravimetry, APHA 2540C |
| **Alkalinity** | APHA 2320B |
| **pH (field)** | EPA 150.1 |
| **Specific conductance (field)** | APHA 2510 |
| **Temperature (field)** | Thermocouple |
| **St. Peter** | |
| **Cations:**<br>Al, Ba, Mn, As, Cd, Cr, Cu, Pb, Sb Se, and Tl | ICP-MS,<br>EPA Method 6020 |

| Parameters | Analytical Methods[1,2] |
|---|---|
| **Cations:** Ca, Fe, K, Mg, Na, and Si | ICP-OES, EPA Method 6010B |
| **Anions:** Br, Cl, F, $NO_3$, and $SO_4$ | Ion Chromatography, EPA Method 300.0 |
| **Dissolved $CO_2$** | Coulometric titration, ASTM D513-11 |
| **Isotopes:** $\delta^{13}C$ of DIC | Isotope ratio mass spectrometry |
| **Total Dissolved Solids** | Gravimetry, APHA 2540C |
| **Alkalinity** | APHA 2320B |
| **pH (field)** | EPA 150.1 |
| **Specific conductance (field)** | APHA 2510 |
| **Temperature (field)** | Thermocouple |
| **Ironton-Galesville** | |
| **Cations:** Al, Ba, Mn, As, Cd, Cr, Cu, Pb, Sb Se, and Tl | ICP-MS, EPA Method 6020 |
| **Cations:** Ca, Fe, K, Mg, Na, and Si | ICP-OES, EPA Method 6010B |
| **Anions:** Br, Cl, F, $NO_3$, and $SO_4$ | Ion Chromatography, EPA Method 300.0 |
| **Dissolved $CO_2$** | Coulometric titration, ASTM D513-11 |
| **Isotopes:** $\delta^{13}C$ of DIC | Isotope ratio mass spectrometry |
| **Total Dissolved Solids** | Gravimetry, APHA 2540C |
| **Water Density(field)** | Oscillating body method |
| **Alkalinity** | APHA 2320B |
| **pH (field)** | EPA 150.1 |
| **Specific conductance (field)** | APHA 2510 |
| **Temperature (field)** | Thermocouple |

Notes:
1. An equivalent method may be employed with prior approval of the UIC Program Director.
2. ICP = inductively coupled plasma; MS = mass spectrometry; OES = optical emission spectrometry.

**Table 4. Sampling and recording frequencies for continuous monitoring.[1,2]**

| Well Condition | Minimum sampling frequency: once every | Minimum recording frequency: once every |
|---|---|---|
| For continuous monitoring of the well: | 5 seconds | 5 minutes [3,4] |
| For the well when shut-in: | 4 hours | 4 hours |

Notes:

1. Sampling frequency refers to how often the monitoring device obtains data from the well for a particular parameter. For example, a recording device might sample a pressure transducer monitoring injection pressure once every two seconds and save this value in memory.
2. Recording frequency refers to how often the sampled information gets recorded to digital format (such as a computer hard drive). Following the same example above, the data from the injection pressure transducer might be recorded to a hard drive once every minute.
3. This can be an average of the sampled readings over the previous 5-minute recording interval, or the maximum (or minimum, as appropriate) value identified over that recording interval.
4. DTS is sampled every 5 seconds on ½ meter increments along the wellbore. The data is averaged and recorded at six hour intervals.

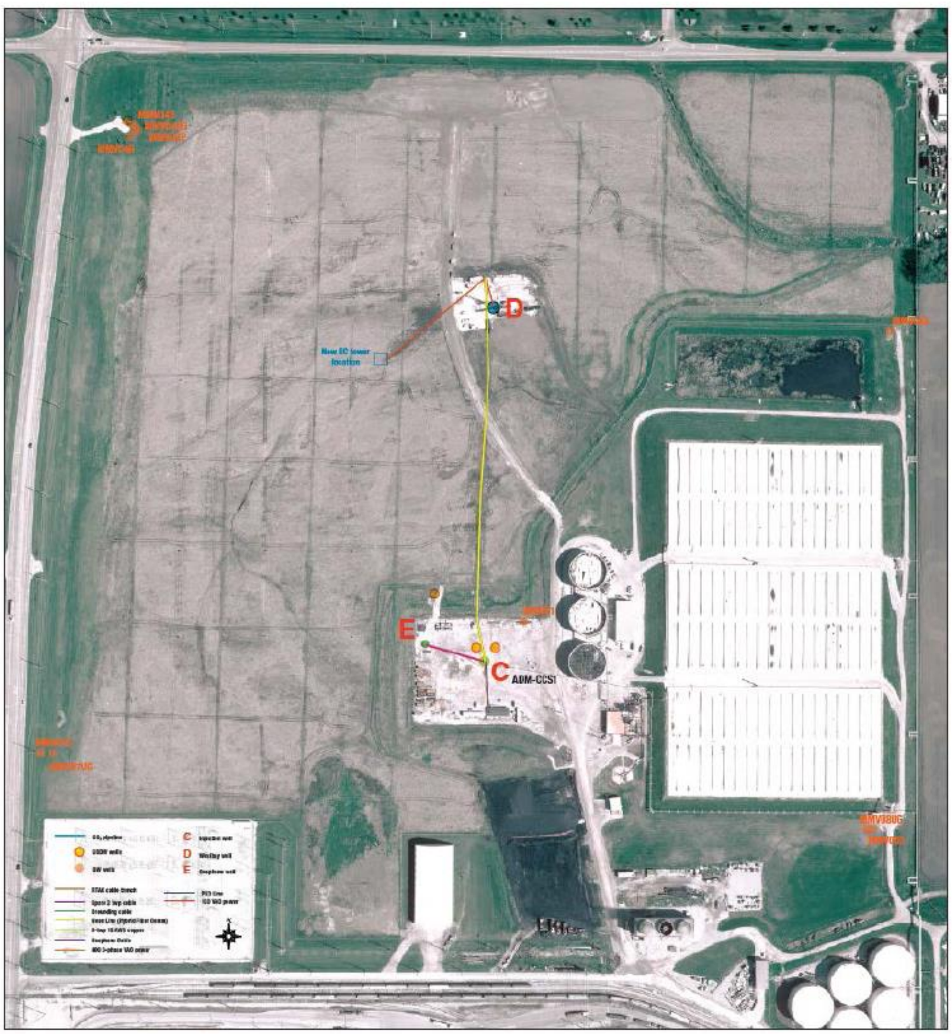


**Figure 3. Location of CCS#1 (C), VW#1 (D), and GM#1 (E).**

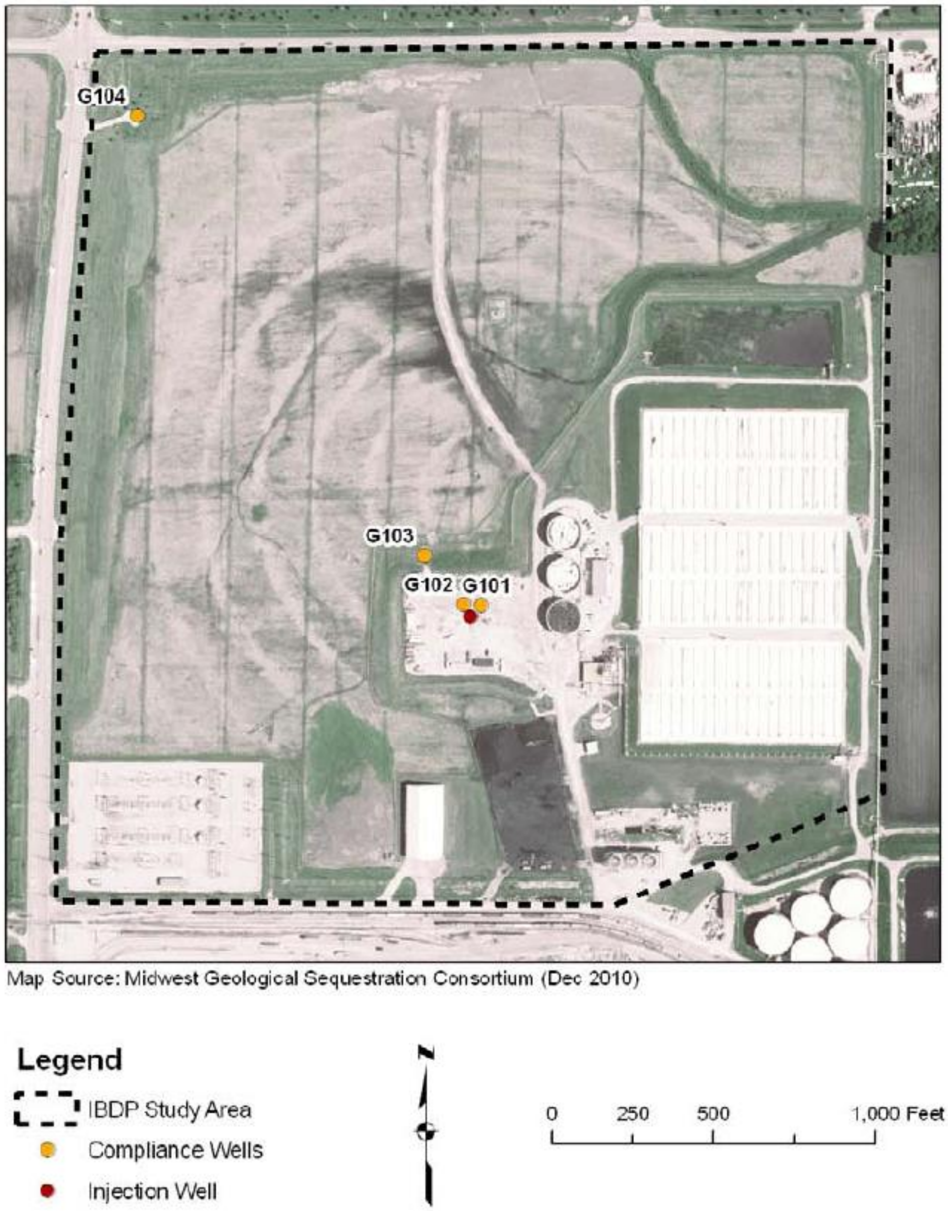


**Figure 4. Location of shallow monitoring wells G101, G012, G103, and G104 relative to CCS#1 (red dot).**

## Monitoring Well Mechanical Integrity Testing (MITs)

ADM will establish and maintain mechanical integrity for all of the monitoring wells to be used in the post-injection testing and monitoring program, including CCS#1, which will be used for monitoring after all injection at CCS#1 is complete. Internal and external MITs will be conducted on all monitoring wells at least every 5 years, until they are plugged. Table 5 presents the types of MITs that will be used for each of the IBDP wells. These methods are described below.

**Table 5. Mechanical Integrity Tests for IBDP wells.**

| Well Name | Internal Mechanical Integrity Test[1] | External Mechanical Integrity Test[1] |
|---|---|---|
| CCS #1 | Pressure test or casing inspection log | Noise log or oxygen activation log |
| VW #1 | Pressure test | Noise log or oxygen activation log |
| GM #1 | Pressure test or casing inspection log | Noise log or oxygen activation log |

Note:
1. An alternative method may be employed with prior approval of the UIC Program Director.

## ***Description of MIT(s) that may be Employed***

### Noise Logging

To ensure the mechanical integrity of the casing of the injection well, logging data will be recorded across the wellbore from the surface down to the primary caprock. Bottom hole pressure data near the packer will also be provided. Noise logging will be carried out while injection is occurring. If ambient noise is greater than 10 mv, injection will be halted. The following procedures will be employed:

1. Move in and rig up an electrical logging unit with lubricator.
2. Run a noise survey from the Base of the Maquoketa Formation (or higher) to the deepest point reachable in the Mt. Simon.
3. Make noise measurements at intervals of 100 feet to create a log on a coarse grid.
4. If any anomalies are evident on the coarse log, construct a finer grid by making noise measurements at intervals of 20 feet within the coarse intervals containing high noise levels.
5. Make noise measurements at intervals of 10 feet through the first 50 feet above the injection interval and at intervals of 20 feet within the 100-foot intervals containing:
    a. The base of the lowermost bleed-off zone above the injection interval, and
    b. The base of the lowermost USDW (St. Peter).
6. Additional measurements may be made to pinpoint depths at which noise is produced.
7. Use a vertical scale of 1 or 2 inches per 100 feet.
8. Rig down the logging equipment.

9. Interpret the data as follows: Determine the base noise level in the well (dead well level). Identify departures from this level. An increase in noise near the surface due to equipment operating at the surface is to be expected in many situations. Determine the extent of any movement; flow into or between USDWs indicates a lack of mechanical integrity; flow from the injection zone into or above the confining zone indicates a failure of containment.

Oxygen Activation (OA) Logging

To ensure the mechanical integrity of the casing of the injection well, logging data will be recorded across the wellbore from the surface down to the primary caprock. Bottom hole pressure data near the packer will also be provided. OA logging will be carried out while injection is occurring. The following procedures will be employed:

1. Move in and rig up an electrical logging unit with lubricator.

2. Conduct a baseline Gamma Ray Log and casing collar locator log from the top of the injection zone to the surface prior to taking the stationary readings with the OA tool. [1]

3. The OA log shall be used only for casing diameters of greater than 1-11/16 inches and less than 13- 3/8 inches.

4. Prior to taking the stationary readings, the OA tool must be properly calibrated in a "no vertical flow behind the casing" section of the well to ensure accurate, repeatable tool response and for measuring background counts.

5. Take, at a minimum, a 15 minute stationary reading adjacent to the confining interval located immediately above the injection interval. This must be at least 10 feet above the injection interval so that turbulence does not affect the readings.

6. Take, at a minimum, a 15 minute stationary reading at a location approximately midway between the base of the lowermost USDW and the confining interval located immediately above the injection interval.

7. Take, at a minimum, a 15 minute stationary reading adjacent to the top of the confining zone.

8. Take, at a minimum, a 15 minute stationary reading at the base of the lowermost USDW.

9. If flow is indicated by the OA log at a location, move uphole or downhole as necessary at no more than 50 foot intervals and take stationary readings to determine the area of fluid migration.

10. Interpret the data: Identification of differences in the activated water's measured gamma ray count-rate profile versus the expected count-rate profile for a static environment. Differences between the measured and expected may indicate flow in the annulus or behind the casing. The flow velocity is determined by measuring the time that the activated water passes a detector.

Note 1: Gamma Ray Log is necessary to evaluate the contribution of naturally occurring background radiation to the total gamma radiation count detected by the OA tool. There are different types of natural radiation emitted from various geologic formations or zones and the natural radiation may change over time.

**<u>$CO_2$ Plume and Pressure-Front Tracking</u>**

ADM will employ direct and indirect methods to track the extent of the $CO_2$ plume and the presence or absence of elevated pressure.

Table 6 (on page E15) and Table 7 (on page E16) present the direct and indirect methods that ADM will use to monitor the $CO_2$ plume, including the activities, locations, and frequencies ADM will employ. ADM will conduct fluid sampling and analysis to detect changes in ground water in order to directly monitor the $CO_2$ plume. The parameters to be analyzed as part of fluid sampling in the Mt. Simon (and associated analytical methods) are presented in Table 8 (on page E16). Indirect plume monitoring will be employed using pulsed neutron capture/reservoir saturation tool (RST) logs to monitor $CO_2$ saturation and 3D surface seismic surveys. Quality assurance procedures for seismic monitoring methods are presented in Section B.9 of the QASP.

Table 9 (on page E17) presents the direct and indirect methods that ADM will use to monitor the pressure front, including the activities, locations, and frequencies ADM will employ. ADM will deploy pressure/temperature monitors and distributed temperature sensors to directly monitor the position of the pressure front. Passive seismic monitoring using a combination of borehole and surface seismic stations to detect local events over M 1.0 within the AoR will also be performed. Quality assurance procedures for seismic monitoring methods are presented in Section B.9 of the QASP.

**Table 6. Post-injection phase plume monitoring.[1]**

| Target Formation | Monitoring Activity | Monitoring Location(s) | Frequency: Interim Period | Frequency: CCS#2 Injection Phase | Frequency: CCS#2 Post-Injection Phase |
|---|---|---|---|---|---|
| **Direct Plume Monitoring** | | | | | |
| Mt. Simon | Fluid sampling | VW#1 | Once[2] | Year 1-3: Annual<br>Year 4-5: None | None |
| | | VW#2 | None | Annual | Annual |
| **Indirect Plume Monitoring** | | | | | |
| Mt. Simon | Pulse neutron logging/RST[3] | VW#1 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| | | VW#2 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| | | CCS#1 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| | | CCS#2 | Once | Year 2, Year 4 | Year 1, Year 3, Year 5, Year 7, Year 10 |
| Mt. Simon | Time-lapse VSP | As specified in Table 7. | | | |
| | 3D surface seismic survey | | | | |

Notes:
1. Sampling and geophysical surveys will occur within 45 days before the anniversary date of cessation of injection or alternatively scheduled with the prior approval of the UIC Program Director.
2. The interim period fluid sampling listed in the table will be conducted at each specified well prior to completion of the CCS#1 operational period or during the CCS#1 interim period. This sampling can be used to satisfy both this interim period sampling requirement and the baseline sampling requirement described in Attachment C to the CCS#2 permit (IL-115-6A-0001).
3. A single round of pulse neutron logging/RST logging conducted at each specified well prior to completion of the CCS#1 operational period or during the CCS#1 interim period. This logging can be used to satisfy both this interim period logging requirement and the baseline logging requirement described in Attachment C to the CCS#2 permit (IL-115-6A-0001).

**Table 7. Schedule for seismic monitoring.**

| Timing[1] | | Type of Survey | Extent/Coverage/Resolution[2] |
|---|---|---|---|
| CCS#1 Injection Phase[3] | 2009 | Baseline 3D Surface Seismic Survey | Extent of Survey = 2,600 Acres.<br>Fold Image Coverage = 2,000 Acres. |
| | 2011 | Baseline 3D Surface Seismic Survey | Extent of Survey = 2,600 Acres.<br>Fold Image Coverage = 2,000 Acres. |
| | 2011 | Baseline GM#1 Time Lapse 3D VSP | Resolution = 30 Acres. |
| | 2012 | GM#1 Time Lapse 3D VSP | Resolution = 30 Acres. |
| | 2013 | GM#1 Time Lapse 3D VSP | Resolution = 30 Acres. |
| | 2014 | GM#1 Time Lapse 3D VSP | Resolution = 30 Acres. |
| CCS#1 Post-Injection Phase | 2015 | Expanded 3D Surface Seismic Survey | Extent of Survey = 3,000 Acres.<br>Fold Image Coverage = 2,200 Acres. |
| | 2020 | Time Lapse 3D Surface Seismic Survey | Extent of Survey = 2,000 Acres.<br>Fold Image Coverage = 600 Acres. |
| | 2030 | Time Lapse 3D Surface Seismic Survey | Extent of Survey = 2,000 Acres.<br>Fold Image Coverage = 600 Acres. |

Notes:
1. Seismic surveys will be performed in the 4th quarter before or the 1st quarter of the calendar year shown or alternatively scheduled with the prior approval of the UIC Program Director.
2. Reported survey area/coverage/resolution are approximate.
3. Provided for reference. These monitoring events have already taken place.

**Table 8. Summary of analytical and field parameters for fluid sampling in the Mt. Simon.**

| **Parameters** | **Analytical Methods[1,2]** |
|---|---|
| **Cations:**<br>Al, Ba, Mn, As, Cd, Cr, Cu, Pb, Sb Se, and Tl | ICP-MS,<br>EPA Method 6020 |
| **Cations:**<br>Ca, Fe, K, Mg, Na, and Si | ICP-OES,<br>EPA Method 6010B |
| **Anions:**<br>Br, Cl, F, $NO_3$, and $SO_4$ | Ion Chromatography,<br>EPA Method 300.0 |
| **Dissolved $CO_2$** | Coulometric titration,<br>ASTM D513-11 |
| **Isotopes:** $\delta^{13}C$ of DIC | Isotope ratio mass spectrometry |
| **Total Dissolved Solids** | Gravimetry; APHA 2540C |
| **Water Density(field)** | Oscillating body method |
| **Alkalinity** | APHA 2320B |
| **pH (field)** | EPA 150.1 |
| **Specific conductance (field)** | APHA 2510 |
| **Temperature (field)** | Thermocouple |

| Parameters | Analytical Methods[1,2] |
|---|---|
| Notes:<br>1. An equivalent method may be employed with the prior approval of the UIC Program Director.<br>2. ICP = inductively coupled plasma; MS = mass spectrometry; OES = optical emission spectrometry. | |

**Table 9. Post-injection phase pressure-front monitoring and other monitoring.[1,2]**

| Target Formation | Monitoring Activity | Monitoring Location(s) | Frequency: Interim Period | Frequency: CCS#2 Injection Phase | Frequency: CCS#2 Post-Injection Phase |
|---|---|---|---|---|---|
| Mt. Simon | Pressure/ temperature monitoring | VW#1 | Continuous[3] | Year 1-3: Continuous<br>Year 4-5: None | None |
| | | VW#2 | None | Continuous | Continuous |
| | | CCS#1 | Continuous[3] | Continuous | Year 1-3: Continuous<br>Year 4-10: Annual |
| | | CCS#2 | None | Continuous | Year 1-3: Continuous<br>Year 4-10: Annual |
| Mt. Simon | Distributed temperature sensing (DTS) | CCS#1 | Continuous[3] | Continuous | Year 1: Continuous<br>Year 2-10: None |
| | | CCS#2 | None | Continuous | Year 1: Continuous<br>Year 2-10: None |
| Multiple | Passive seismic[4] | A combination of borehole and surface seismic stations located within the AoR | None | Continuous | Continuous |

Notes:
1. Collection and recording of continuous monitoring data will occur at the frequencies described in Table 4.
2. Annual monitoring surveys will occur up to 45 days before the anniversary date of cessation of injection or alternatively scheduled with the prior approval of the UIC Program Director.
3. During well maintenance activities, pressure and temperature monitoring may be suspended.
4. The passive seismic monitoring system has the ability to detect seismic events over M1.0 within the AoR.

## Schedule for Submitting Post-Injection Monitoring Results

All post-injection site care monitoring data and monitoring results (i.e., resulting from the ground water monitoring and plume and pressure-front tracking described above and the results of MITs on the wells) will be submitted to EPA in annual reports. These reports will be submitted each year, within 60 days following the anniversary date of the date on which injection ceases or alternatively with the prior approval of the UIC Program Director.

The annual reports will contain information and data generated during the reporting period; i.e., seismic data acquisition, well-based monitoring data, sample analysis, and the results from updated site models.

## Alternative Post-Injection Site Care Timeframe

ADM will conduct post-injection monitoring until site closure at CCS#2 is authorized (i.e., 10 years following the cessation of injection operations at CCS#2 and upon a successful non-endangerment demonstration). ADM has demonstrated that an alternative PISC timeframe is appropriate for CCS#2, pursuant to 40 CFR 146.93(c)(1). This demonstration is based on the computational modeling to delineate the AoR; predictions of plume migration, pressure decline, and $CO_2$ trapping; site-specific geology; well construction; and the distance between the injection zone and the nearest USDWs.

ADM will conduct all of the monitoring described under "Ground Water Quality Monitoring" and "$CO_2$ Plume and Pressure-Front Tracking" above and report the results as described under "Schedule for Submitting Post-Injection Monitoring Results." This will continue until ADM demonstrates, based on monitoring and other site-specific data, that no additional monitoring is needed to ensure that the project does not pose an endangerment to any USDWs, per the requirements at 40 CFR 146.93(b)(2) or (3).

If any of the information on which the demonstration was based changes or the actual behavior of the site varies significantly from modeled predictions, e.g., as a result of an AoR reevaluation, ADM may update this PISC and Site Closure Plan pursuant to 40 CFR 146.93(a)(4). ADM will update the PISC and Site Closure Plan within 6 months of ceasing injection or demonstrate that no update is needed and as necessary during the duration of the PISC timeframe.

## Non-Endangerment Demonstration Criteria

Prior to receiving approval of the end of the PISC period, the operator will submit a demonstration of non-endangerment of USDWs to the UIC Program Director, per 40 CFR 146.93(b)(2) or (3).

The operator will issue a report to the UIC Program Director. This report will make a demonstration of USDW non-endangerment based on the evaluation of the site monitoring data used in conjunction with the project's computational model. The report will detail how the non-endangerment demonstration evaluation uses site-specific conditions to confirm and demonstrate non-endangerment. The report will include all relevant monitoring data and interpretations upon which the non-endangerment demonstration is based, model documentation and all supporting data, and any other information necessary for the UIC Program Director to review the analysis. The report will include the following sections:

### *Summary of Existing Monitoring Data*

A summary of all previous monitoring data collected at the site during the injection phase, pursuant to the Class I permit issued for the well (and collected under Illinois Environmental Protection Agency Permit No.: UIC-012-ADM) and this PISC and Site Closure Plan, including data collected during the injection and PISC phases of the project, will be submitted to help demonstrate non-endangerment. Data submittals will be in a format acceptable to the UIC Program Director [40 CFR 146.91(e)], and will include a narrative explanation of monitoring activities, including the dates of all monitoring events, changes to the monitoring program over time, and an explanation of all monitoring infrastructure that has existed at the site. Data will be compared with baseline data collected during site characterization [40 CFR 146.82(a)(6) and 146.87(d)(3)].

### *Comparison of Monitoring Data and Model Predictions and Model Documentation*

The results of computational modeling used for AoR delineation and for demonstration of an alternative PISC timeframe will be compared to monitoring data collected during the operational and PISC periods. The data will include time-lapse temperature, pressure, ground water analysis, passive seismic, and geophysical surveys (i.e., logging, operating-phase VSP, and 3D surface seismic surveys) used to update the computational model and to monitor the site. Data generated during the PISC period will be used to help show that the computational model accurately represents the storage site and can be used as a proxy to determine the plume's properties and size. The operator will demonstrate this degree of accuracy by comparing the monitoring data obtained during the PISC period against the model's predicted properties (i.e., plume location, rate of movement, and pressure decay). Statistical methods will be employed to correlate the data and confirm the model's ability to accurately represent the storage site. The validation of the computational model with the large volume of available data will be a significant element to support the non-endangerment demonstration. Further, the validation of the complete model over the areas, and at the points, where direct data collection has taken place will help to ensure confidence in the model for those areas where surface infrastructure preclude geophysical data collection and where direct observation wells cannot be placed.

### *Evaluation of $CO_2$ Plume*

The operator will use a combination of time-lapse RST logs, time-lapse VSP surveys, and other seismic methods (see Table 7) to locate and track the extent of the $CO_2$ plume. Figure 5, Figure 6, and Figure 7 present examples of how the data may be correlated against the model prediction. In Figure 5, a series of RST logs are compared against the model's predicted plume vertical extent at a specific point location at a specified time interval. A good correlation between the two data sets will help provide strong evidence in validating the model's ability to represent the storage system. Similarly, Figure 6 illustrates a comparison of the time-lapse VSPs against the predicted spatial extent of the plume at a specified time interval. Also, limited seismic surveys may be employed to determine the plume location at specific times, as noted in Table 7 and demonstrated in Figure 7. The data produced by these activities will be compared against the model using statistical methods to validate the model's ability to accurately represent the storage site. Figure 7 presents an example of how the data from time-lapse 3D seismic surveys may be correlated against the model prediction.

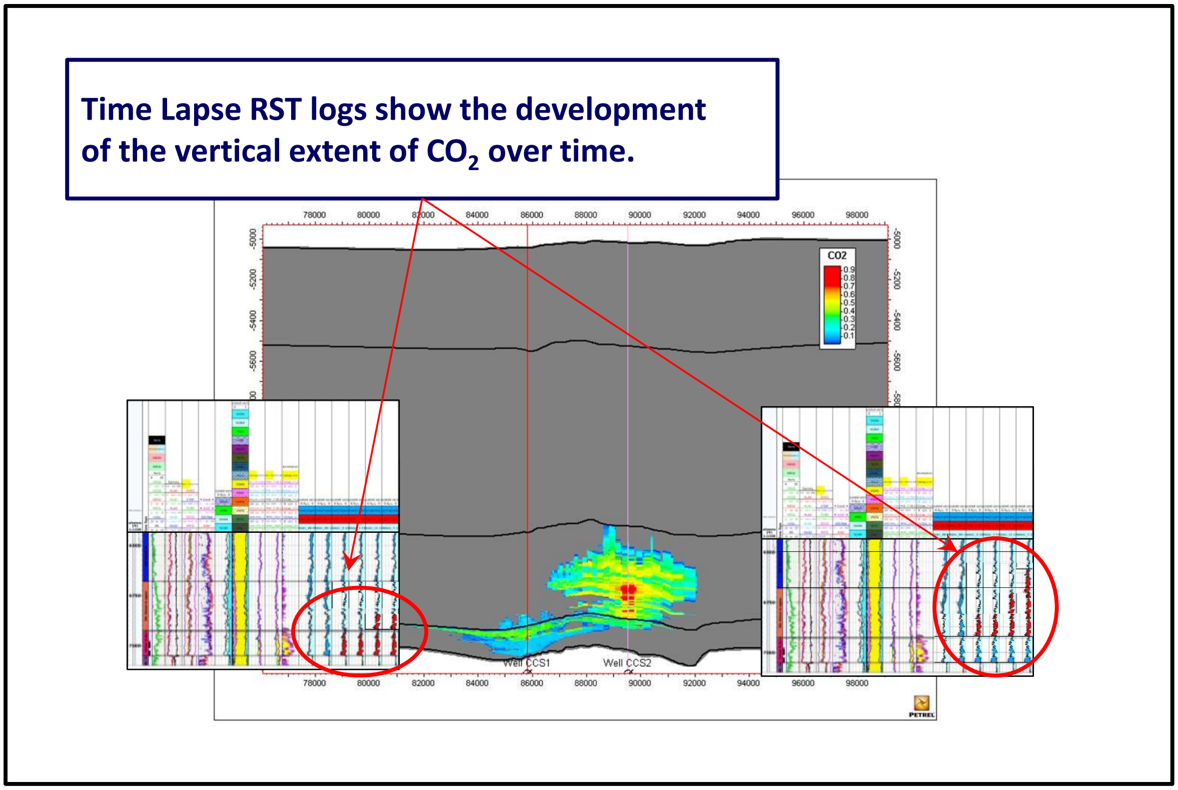


**Figure 5. Comparison of the time-lapse RST logs against the predicted vertical extent of the plume at a specific time interval during the operational and PISC period can provide validation of the model's accuracy.**

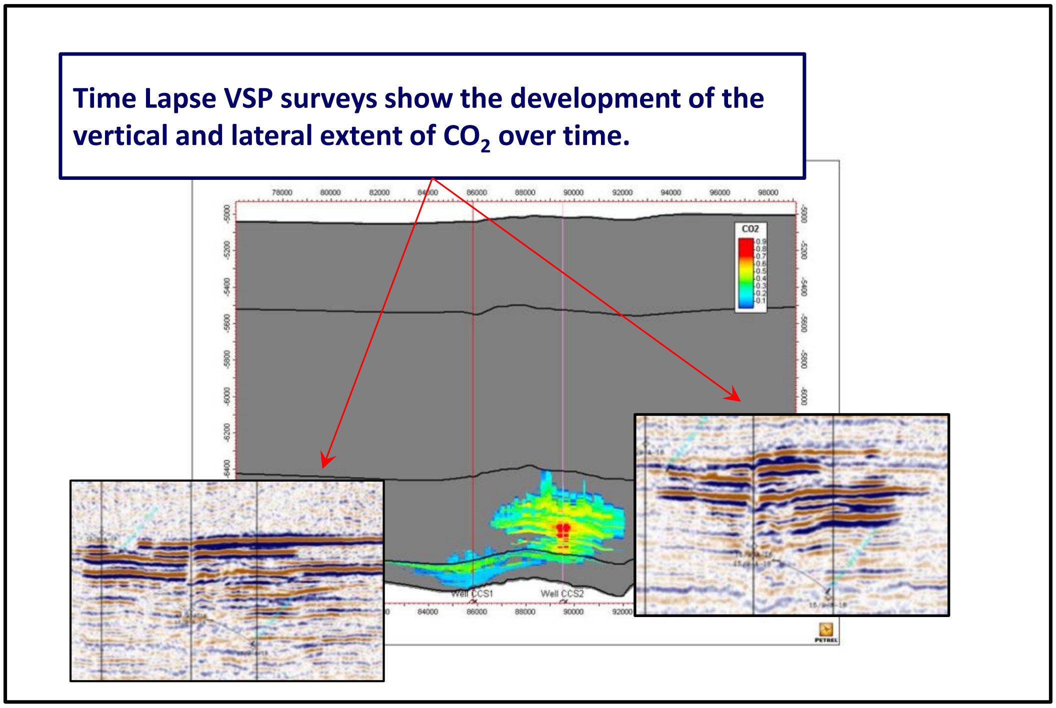


**Figure 6. Comparison of the time-lapse VSPs against the predicted spatial extent of the plume at specific time intervals during the operational and PISC period can provide validation of the model's accuracy.**

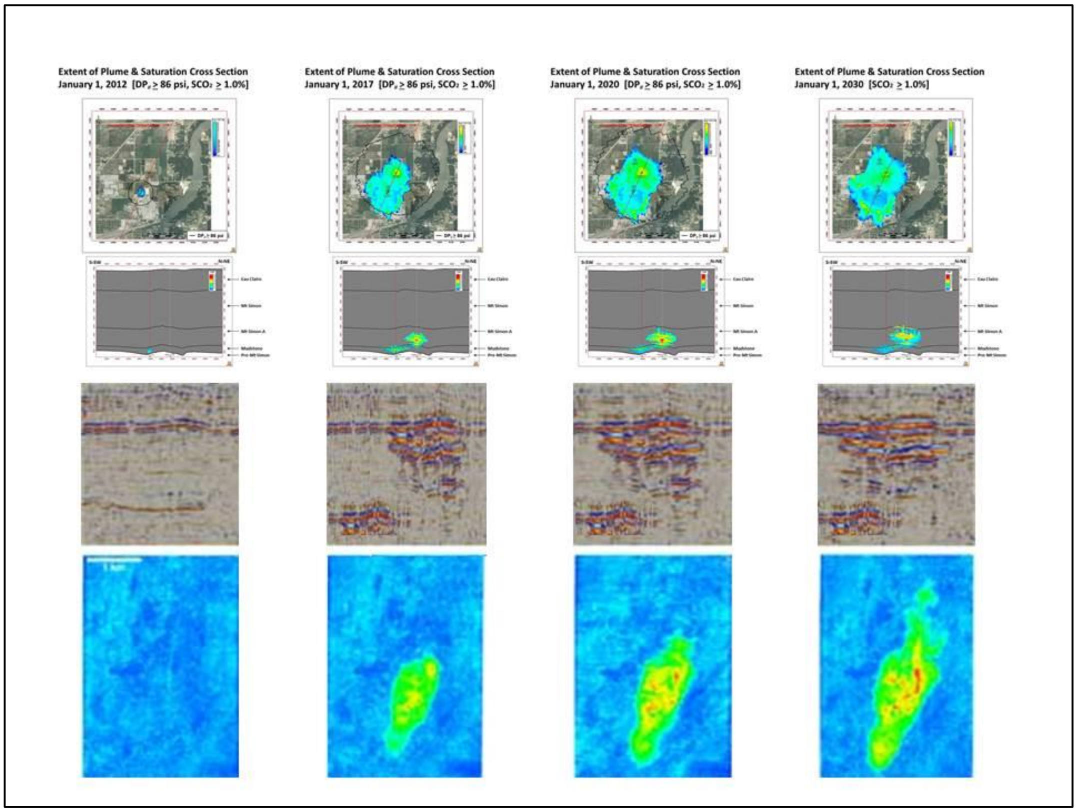


**Figure 7. Comparison of the time-lapse surface 3D against the predicted spatial extent of the plume at specific time intervals during the operational and PISC period can provide validation of the model's accuracy.**

Regarding the separate-phase $CO_2$ plume, the PISC monitoring data will be used to support a demonstration of the stabilization of the $CO_2$ plume as the reservoir pressure returns toward its pre-injection state. The storage site (Mt. Simon) is considered to be an open reservoir system with a regional dip oriented NW (up-dip) to SE (down-dip) and having excellent porosity (20%) and permeability (120 mD). Locally, the storage interval has thin stratigraphic bands of low permeability siltstone to mudstone. These bands act as baffles that restrict the plume's vertical movement. Modeling performed to delineate the plume and pressure front predicts that, during the PISC period, the $CO_2$ will gradually rise through the reservoir until it encounters a baffle at which time it pools and spreads laterally. Based on the results of a 50-year post-injection simulation, the top of the $CO_2$ plume is about 900 vertical feet below the primary seal formation (Eau Claire Shale). Additionally, the model predicts that over half the $CO_2$ will have become immobilized within the formation. This, in conjunction with the reservoir pressure returning to its pre-injection state, will be used to indicate there is essentially no driving force to cause significant plume movement. Indeed, the middle Mt. Simon contains intervals of eolian sandstone, which are very tightly cemented by quartz overgrowths with some facies having permeabilities <0.01 mD. These intervals will act as more than a baffle and will significantly impede any vertical plume migration due to buoyancy forces.

The stabilization of the site conditions combined with the site's characteristic of not having any local penetrations of the seal formation will be the central focus of the operator's demonstration of non-endangerment. Equalization of plume to the site's pre-injection conditions will be one element in demonstrating non-endangerment. To demonstrate this, a case was examined to determine how long it would take a slowly expanding plume to reach the nearest penetration of the seal formation. As noted below, the closest penetration of the seal formation is approximately 17 miles from the injection well. Assuming the plume continues to grow at 1% per year, it would take over 600 years for the plume to reach this plugged and abandoned well. Because this well is down dip from the injection well, it is likely the plume will never reach this location.

### *Evaluation of Mobilized Fluids*

In addition to $CO_2$, mobilized fluids may pose a risk to USDWs. These include native fluids that are high in total dissolved solids (TDS) and therefore may impair a USDW, and fluids containing mobilized drinking water contaminants (e.g., arsenic, mercury, hydrogen sulfide). The geochemical data collected from monitoring wells will be used to demonstrate that no mobilized fluids have moved above the seal formation and therefore after the PISC period would not pose a risk to USDWs. In order to demonstrate non-endangerment, the operator will compare the operational and PISC period samples from layers above the injection zone, including the lowermost USDW, against the pre-injection baseline samples. This comparison will support a demonstration that no significant changes in the fluid properties of the overlying formations have occurred and that no mobilized formation fluids have moved through the seal formation. This validation of seal integrity will help demonstrate that the injectate and or mobilized fluids would not represent an endangerment to any USDWs.

Additionally, RST logs will be used to monitor the salinity of the reservoir fluids in the observation zone above the Eau Claire Shale seal. Figure 8 shows the relationship between salinity and sigma for two different temperatures while Table 10 shows the compositions of the ground water at various intervals. This table shows the difference between the salinity level of the Mt. Simon and the Ironton-Galesville (the interval directly above the confining zone). By comparing the time-lapse RST logs against the pre-injection baseline logs, the operator will be able to monitor any changes in reservoir fluid salinity. RST logs indicating steady salinity levels within each zone would indicate no movement of fluids out of the storage unit, confirming the integrity of the well and seal formation.

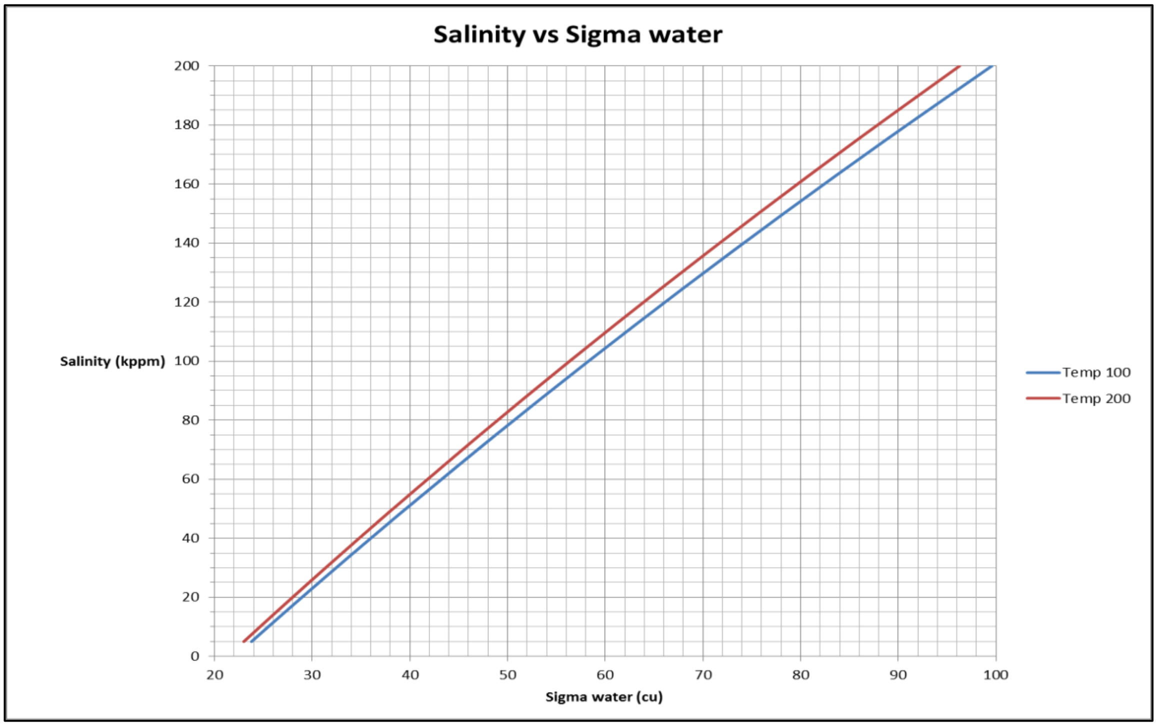


**Figure 8. The red and blue lines show the relationship between salinity and sigma for at 100°F and 200°F.**

**Table 10. Fluid parameters for the Pennsylvanian, Ironton-Galesville, and Mt. Simon.**

| Constituent | Pennsylvanian | Ironton-Galesville | Mt. Simon |
|---|---|---|---|
| Conductivity (mS/cm) | 1.5 | 80 | 170 |
| TDS (mg/L) | 1,000 | 65,600 | 190,000 |
| $Cl^-$ (mg/L) | 170 | 36,900 | 120,000 |
| $Br^-$ (mg/L) | 1 | 180 | 680 |
| Alkalinity (mg/L) | 380 | 130 | 80 |
| $Na^+$ (mg/L) | 140 | 17,200 | 50,000 |
| $Ca^{2+}$ (mg/L) | 100 | 5,200 | 19,000 |
| $K^+$ (mg/L) | 1 | 520 | 1,700 |
| $Mg^{2+}$ (mg/L) | 50 | 950 | 1,800 |
| pH (units) | 7.2 | 6.9 | 5.9 |

### *Evaluation of Reservoir Pressure*

The operator will also support a demonstration of non-endangerment to USDWs by showing that during the PISC period, the pressure within the Mt. Simon rapidly decreases toward its pre-injection static reservoir pressure. Because the increased pressure during injection is the primary driving force for fluid movement that may endanger a USDW, the decay in the pressure differentials will provide strong justification that the injectate does not pose a risk to any USDWs.

The operator will monitor the downhole reservoir pressure at various locations and intervals using a combination of surface and downhole pressure gauges. The measured pressure at a specific depth interval will be compared against the pressure predicted by the computational model. Agreement between the actual and the predicted values will help validate the accuracy of the model and further demonstrate non-endangerment. Figure 9 provides an illustrative example of how the operator will demonstrate agreement between the computational model prediction and the actual measured parameters at the various monitoring wells and respective measurement depths. This example figure shows that during the PISC period, the actual reservoir pressure (red line) falls to pre-injection levels and has a decay rate similar to the rate predicted by the model. Based on risk-based criteria listed in the PISC and Site Closure Plan, pressure decline toward pre-injection levels is one factor indicative of USDW non-endangerment. The close alignment between the predicted and actual pressures will further validate the model's accuracy in representing the reservoir system.

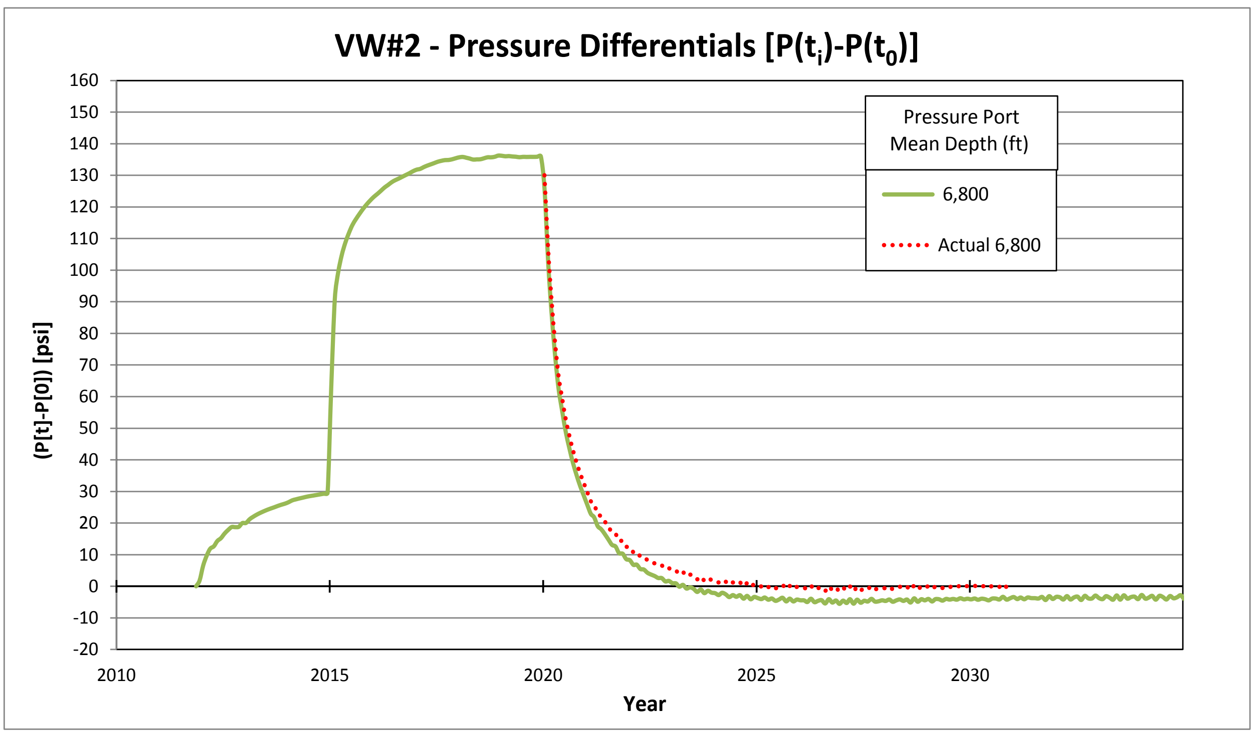


**Figure 9. Illustration of Verification Well #2 comparison of actual dP versus the predicted monitoring interval dP during PISC period through year 2030.**

One of the key comparisons that may be made is between the observed injection reservoir pressure and the model predicted pressure. Figure 10 shows the differential reservoir pressure predicted for three years after injection ceases at CCS#2, relative to original static reservoir pressure. The contour northeast of the CCS#1 well is the 10 psi contour as predicted by the computational model. Direct observations will be utilized during the PISC period to verify that pressure observations at CCS#1, CCS#2, and VW#2 have declined in conformance with the model. Pressure decline to this level within this time frame is an indication of the excellent lateral continuity within the regionally extensive, open Mt. Simon reservoir. Observed reduction of reservoir pressure to this extent would help validate the model and indicate substantial reduction in the potential of injection-pressure induced brine or $CO_2$ migration.

### *Evaluation of Potential Conduits for Fluid Movement*

As shown in the alternative PISC timeframe demonstration, other than the IDBP and IL-ICCS project wells, there are no potential conduits for fluid movement or leakage pathways within the AoR. As shown in Figure 11, the closest penetration of the seal formation (the Sanders 460 well, API number 121390015003) is approximately 17 miles from CCS#1. Based on the computational model, if the plume were to continue to grow at 1% per year it would take over 600 years for the plume to reach this well. Because this well is down dip from the injection well, it is likely the plume will never reach this location. Based on this information, the potential for fluid movement through artificial penetrations of the seal formation does not present a risk of endangerment to any USDWs.

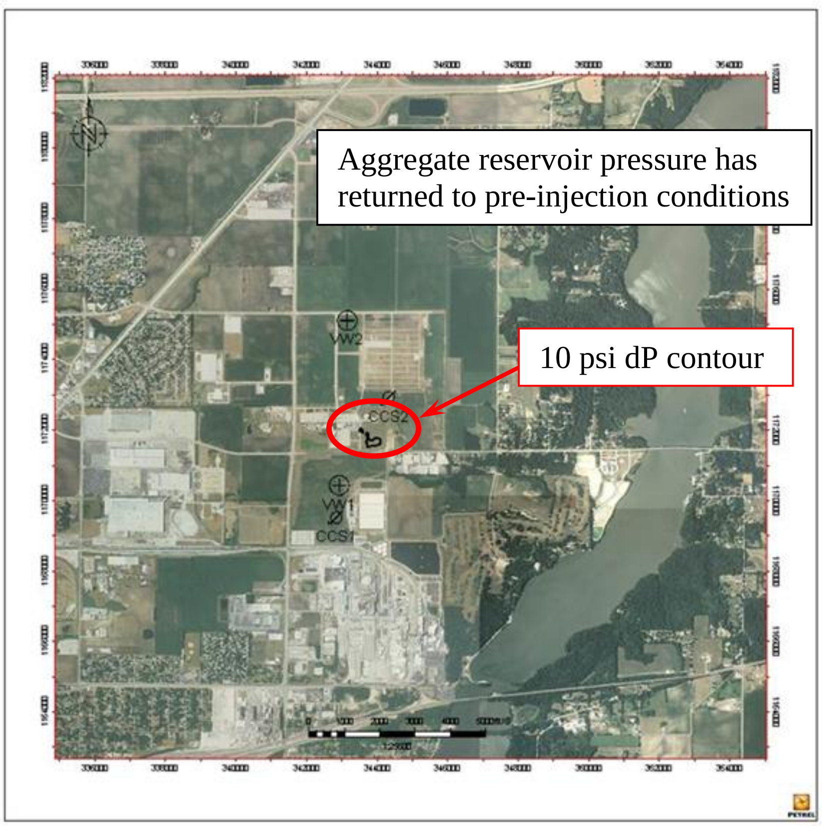


**Figure 10. Direct pressure measurements at CCS#1, CCS#2, and VW#2 will support the 10 psi differential pressure contour as predicted by the flow model (inside red circle) shown at January 1, 2023.**

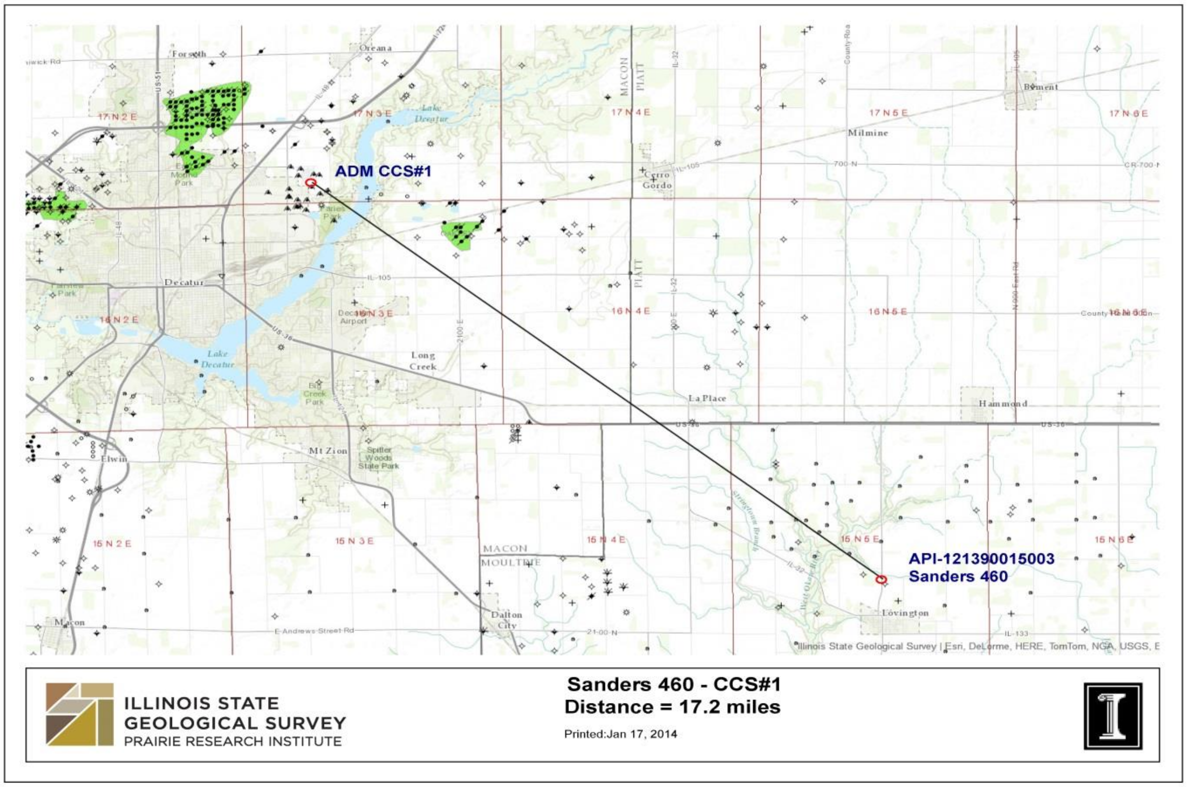


**Figure 11. The closest penetration of the seal formation (Eau Claire) is 17.2 miles from CCS#1. Based on a plume growth of 1.0% per year, it would take over 600 years for the project's $CO_2$ plume to reach this well.**

### *Evaluation of Passive Seismic Data*

Finally, passive seismic monitoring will be used to help further demonstrate seal formation integrity. The operator will provide seismic monitoring data showing that no seismic events have occurred that would indicate fracturing or fault activation near or through the seal formation. This validation of seal integrity will provide further support for a demonstration that the $CO_2$ plume is no longer an endangerment to any USDWs. Figure 12 illustrates how these data could be presented. This figure shows a subset of locatable microseismic events occurring during part of the IBDP project's operational period. From this figure one can see that a majority of the microseismic events occur in the lower Mt. Simon and the Precambrian basement. No events are observed near the Eau Claire seal formation, indicating that no fracturing or fault activation is occurring within this formation. This provides additional verification of the Eau Claire Formation's seal integrity and indicates that to date the response to the imposed fluid pressures due to injection are confined to the vicinity of the injection zone and below.

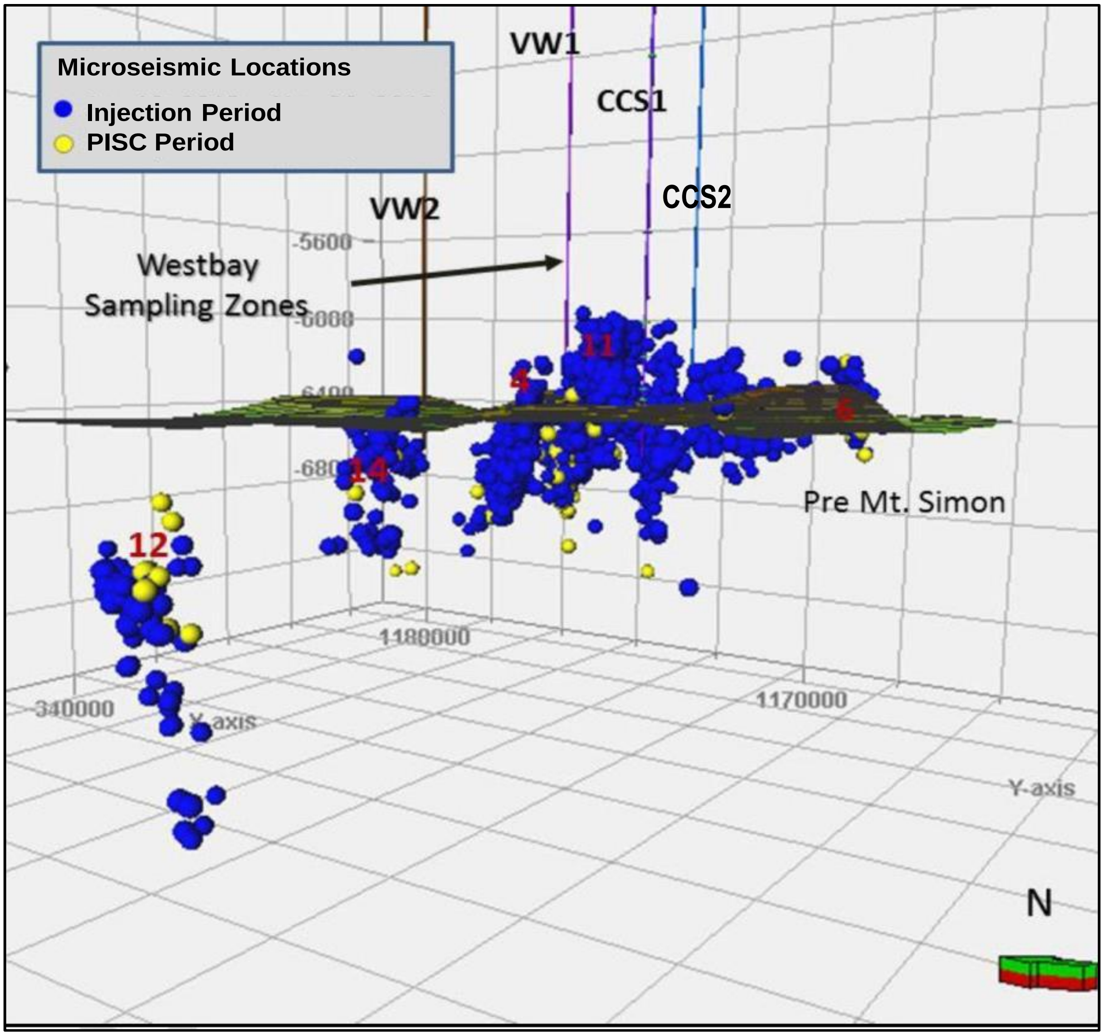


**Figure 12. Example visual representation showing the microseismic activity occurring during the injection and post-injection periods.**

## Site Closure Plan

ADM will conduct site closure activities to meet the requirements of 40 CFR 146.93(e) as described below. ADM will submit a final Site Closure Plan and notify the permitting agency at least 120 days prior of its intent to close the site. Once the permitting agency has approved closure of the site, ADM will plug the verification well(s) and geophysical well(s); restore the site and move out all equipment; and submit a site closure report to EPA. The activities, as described below, represent the planned activities based on information provided to EPA in December 2011. The actual site closure plan may employ different methods and procedures. A final Site Closure Plan will be submitted to the UIC Program Director for approval with the notification of the intent to close the site.

### *Plugging the Verification Well(s)*

At the end of the serviceable life of the verification well, the well will be plugged and abandoned. In summary, the plugging procedure will consist of removing all components of the completion system and then placing cement plugs along the entire length of the well. Prior to placing the cement plugs, casing inspection and temperature logs will be run confirming external mechanical integrity. If a loss of integrity is discovered then a plan to repair using the cement squeeze method will be prepared and submitted to the agency for review and approval. At the surface, the well head will be removed; and the casing will be cut off 3 feet below surface. A detailed procedure follows:

1. In compliance with 40 CFR 146.92(c), notify the regulatory agency at least 60 days before plugging the well and provide updated plugging plan, if applicable.

2. Move in workover unit with pump and tank.

3. Record bottom hole pressure using down hole instrumentation and calculate kill fluid density. Pressure test annulus as per annual MIT requirements.

4. Fill both tubings with kill weight brine as calculated from Bottom hole pressure measurement (expected approximately 9.5 ppg).

5. Nipple down well head and nipple up blow-out preventers (BOPs).

6. Remove all completion equipment from well.

7. Keep hole full with workover brine of sufficient density to maintain well control.

8. Log well with cement bond log (CBL) or Temperature log to confirm external mechanical integrity as per permit requirements.

9. Pick up work string (either 2 7/8’’ or 3 ½’’) and trip in hole to plug back total depth (PBTD).

10. Circulate hole two wellbore volumes to ensure that uniform density fluid is in the well.

11. The lower section of the well will be plugged using $CO_2$ resistant cement from total depth (TD) of 7,166 ft to around 1000 ft above the top of the Eau Claire formation (to approximately 4,000 ft). This will be accomplished by placing plugs in 500 ft increments. Using a density of 15.9 ppg slurry with a yield of 1.11 cf/sk, approximately 360 sacks of cement will be required. (Calculation is 7,166-4,000=3,166 ft X .1305 cu ft/ft = 413.2 cu ft / 1.11 cf/sk = 372 sacks.) This will require at least six plugs of 500 feet in length. No more than two plugs will be set before cement is allowed to set and plugs verified by setting work string weight down onto the plug. After setting last plug with $CO_2$ resistant cement with the plug top at 4,000 feet resume setting plugs with Class A cement to surface. Calculation is 4,000 ft X .1305 cu ft/ft = 522 cu ft/1.18 cu ft/sk = 422 sks Class A cement.

12. Pull ten stands of tubing (600 ft) out and shut down overnight to wait on cement curing.
13. After appropriate waiting period, trip in hole (TIH) ten stands and tag the plug. Resume plugging procedure as before and continue placing plugs until the last plug reaches the surface. Eight plugs will be required.
14. Nipple down BOPs.
15. Remove all well head components and cut off all casings below the plow line.
16. Finish filling well with cement from the surface if needed. Lay down all work string, etc. Clean cellar to where a plate can be welded with well name onto lowest casing string at 3 feet, or as per permitting agency directive.
17. If required, install permanent marker back to surface on which all pertinent well information is inscribed.
18. Fill cellar with topsoil.
19. Rig down workover unit and move out all equipment. Haul off all workover fluids for proper disposal.
20. Reclaim surface to normal grade and reseed location.
21. Complete plugging forms and send in with charts and all lab information to the regulatory agency as required by permit. Plugging report shall be certified as accurate by ADM and shall be submitted within 60 days after plugging is completed.

Note: 7,000 ft 5 ½” 17 #/ft (7,166 ft X .1305 cu ft/ft = 935 cu ft) casing requires an estimated 914 cubic feet of cement to fill, 14 plugs. Six plugs with a total of 372 sacks $CO_2$ resistant cement and eight plugs with a total of 422 sacks will be required. Plugs across open perforations will be tagged and verified so additional cement could be used as required.

Approximately five days required from move in to move out, depending on the operations at hand and the physical constraints of the well, weather, and other conditions.

See Figure 13 on page E31 for a plugging schematic. (Perforation zone(s) are estimated. Well plugging plan will be updated and submitted with the well completion report.)

### *Plugging the Geophysical Well(s)*

At the end of the serviceable life of the well, the well will be plugged and abandoned utilizing the following procedure:

1. Notify the permitting agency of abandonment at least 60 days prior to plugging the well.
2. Remove any monitoring equipment from well head. Well will contain fresh water.

3. Perforate St. Peter formation from 3430-3440 KB depth with 4 shots per foot.

4. Nipple down well head and connect cement pump truck to 3 ½ inch casing. Establish injection rate with fresh water. Mix and pump 142 sacks Class A cement (15.9 ppg). Slow injection rate to ½ bbl/min as cement starts to enter St. Peter perforations. Continue squeezing cement into formation until a squeeze pressure of 500 psi is obtained. Monitor static cement level in casing for 12 hours and fill with cement if needed to top out. Plan to have 50 sacks additional cement above calculated volume on location to top out if needed. Calculation 3 ½ inch 9.3 #/ft tubing .0488 cu ft/ft X 3430ft = 167.9 cu/ft/ 1.18 cu ft/sk = 142 sacks Class A cement.

5. After cement cures, cut off all well head components and cut off all casings below the plow line.

6. Install permanent marker at surface, or as required by the permitting agency.

7. Reclaim surface to normal grade and reseed location.

See the Figure 14 on page E32 for a plugging schematic.

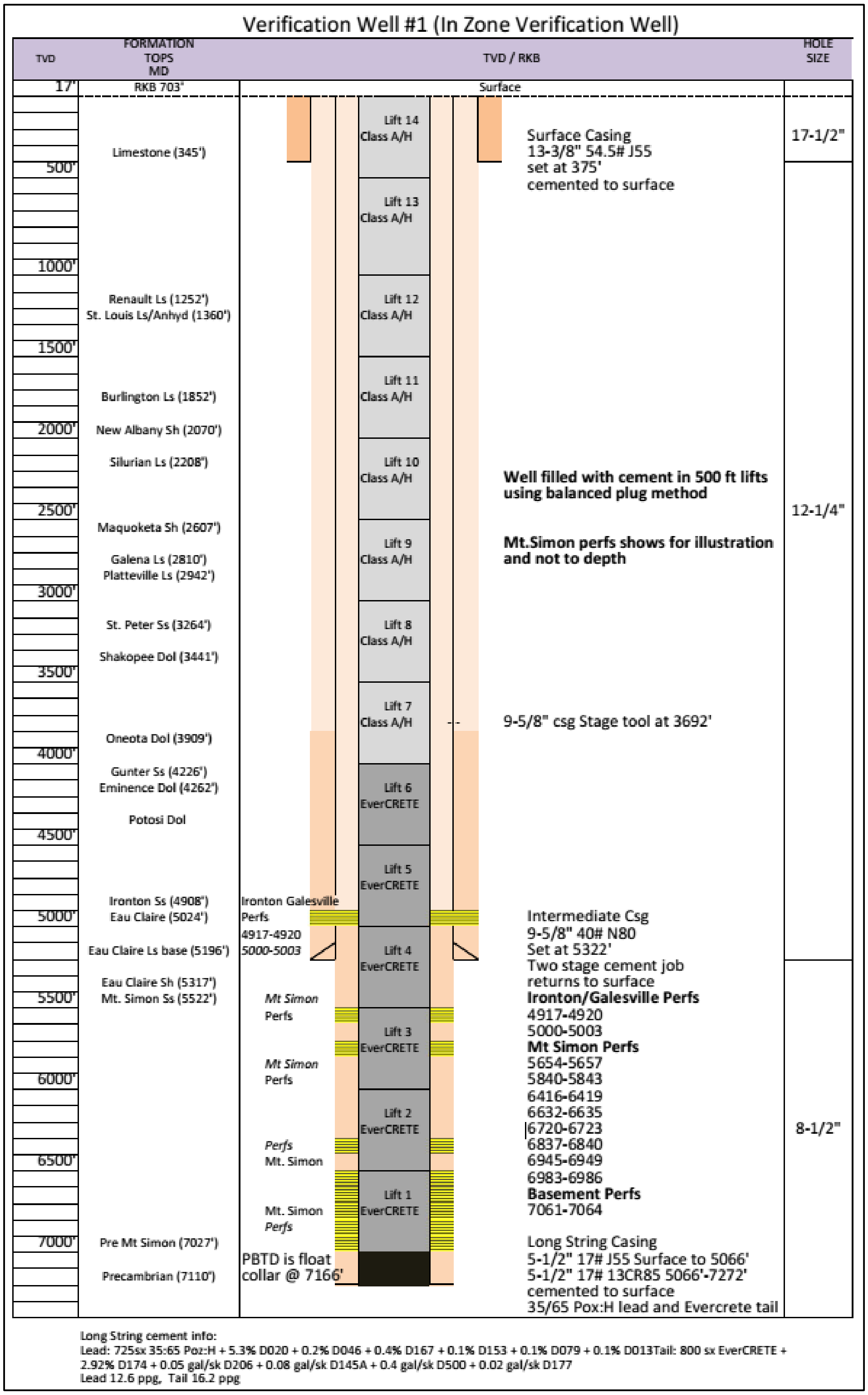


**Figure 13. Representative plugging schematic - Verification Well #1.**

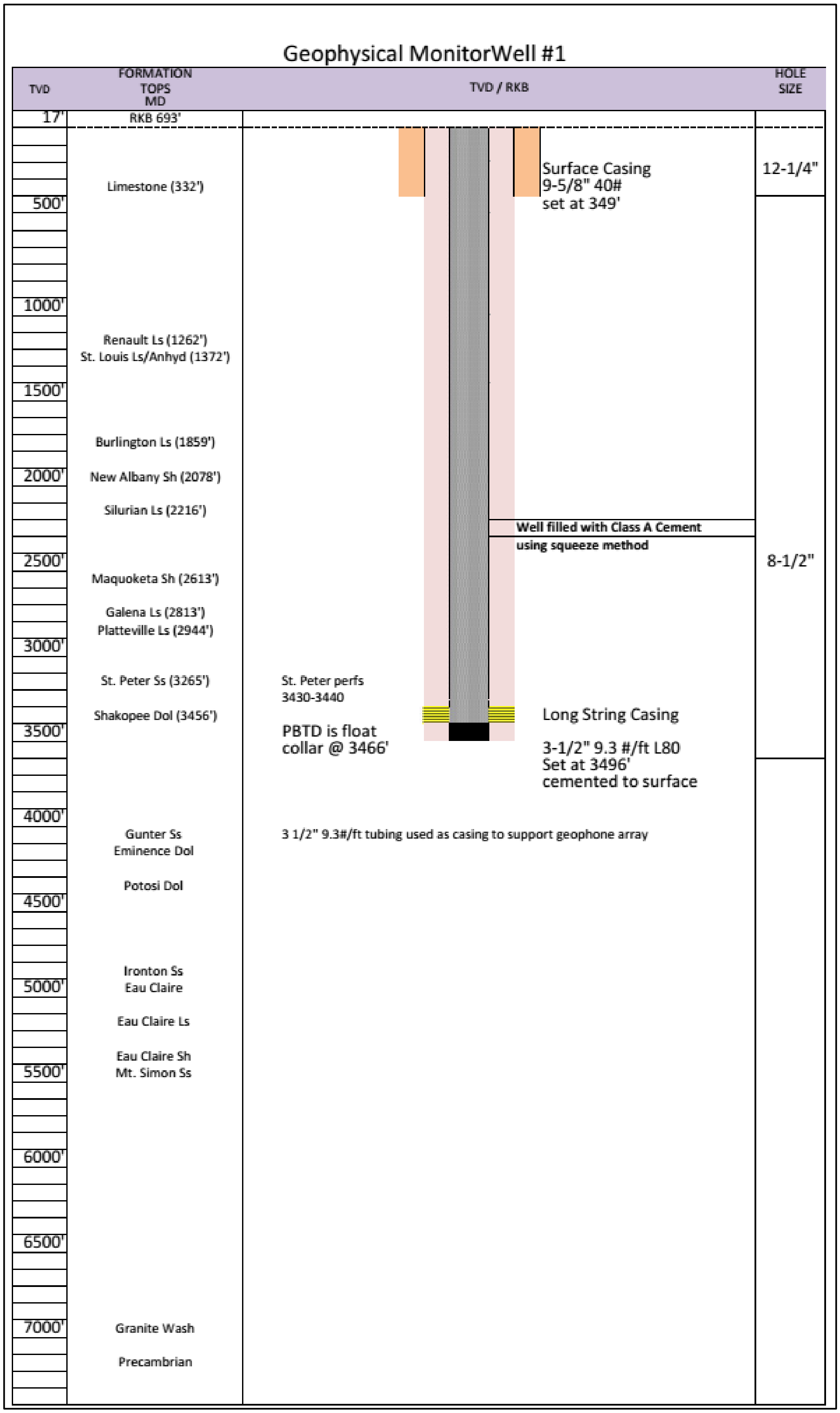


**Figure 14. Representative plugging schematic - Geophysical Well #1.**

### *Planned Remedial/Site Restoration Activities*

To restore the site to its pre-injection condition following site closure, ADM will be guided by the state rules for plugging and abandonment of wells located on leased property under The Illinois Oil and Gas Act: Title 62: Mining Chapter I: Department of Natural Resources - Part 240, Section 240.1170 - Plugging Fluid Waste Disposal and Well Site Restoration.

The following steps will be taken:

1. The free liquid fraction of the plugging fluid waste, which may consist of produced water and/or crude oil, shall be removed from the pit and disposed of in accordance with state and federal regulations (e.g., injection or in above ground tanks or containers pending disposal) prior to restoration. The remaining plugging fluid wastes shall be disposed of by on-site burial.

2. All plugging pits shall be filled and leveled in a manner that allows the site to be returned to original use with no subsidence or leakage of fluids, and where applicable, with sufficient compaction to support farm machinery.

3. All drilling and production equipment, machinery, and equipment debris shall be removed from the site.

4. Casing shall be cut off at least four (4) feet below the surface of the ground, and a steel plate welded on the casing or a mushroomed cap of cement approximately one (1) foot in thickness shall be placed over the casing so that the top of the cap is at least three (3) feet below ground level.

5. Any drilling rat holes shall be filled with cement to no lower than four (4) feet and no higher than three (3) feet below ground level.

6. The well site and all excavations, holes and pits shall be filled and the surface leveled.

### *Site Closure Report*

A site closure report will be prepared and submitted within 90 days following site closure, documenting the following:

- Plugging of the verification and geophysical wells (and the injection well if it has not previously been plugged),

- Location of sealed injection well on a plat of survey that has been submitted to the local zoning authority,

- Notifications to state and local authorities as required at 40 CFR 146.93(f)(2),

- Records regarding the nature, composition, and volume of the injected $CO_2$, and

- Post-injection monitoring records.

ADM will record a notation to the property's deed on which the injection well was located that will indicate the following:

- That the property was used for $CO_2$ sequestration,
- The name of the local agency to which a plat of survey with injection well location was submitted,
- The volume of fluid injected,
- The formation into which the fluid was injected, and
- The period over which the injection occurred.

The site closure report will be submitted to the permitting agency and maintained by the operator for a period of 10 years following site closure. Additionally, the operator will maintain the records collected during the PISC period for a period of 10 years after which these records will be delivered to the UIC Program Director.

## Appendix

Quality Assurance and Surveillance Plan.